# 82MS 570MS 350MS 100MS 991MS

Please read carefully before use and safe keeping, for inspection

## Before getting started...

### ■ Modes

Before starting a calculation, you must first enter the correct mode as indicated in the table below.

| To perform this type of calculation: | Perform this key operation: | To enter this mode: |
|---|---|---|
| Basic arithmetic calculations | MODE 1 | COMP |
| Standard deviation | MODE 2 | SD |
| Regression calculations | MODE 3 | REG |

## Basic Calculations COMP

### ■ Arithmetic Calculations

Use the MODE key to enter the COMP Mode when you want to perform basic calculations.
COMP ..... MODE 1

- Negative values inside of calculations must be enclosed within parentheses. For details, see "Order of Operations."
- It is not necessary to enclose a negative exponent within parentheses.

  sin 2.34 × $10^{-4}$ → sin 2.34 EXP (−) 5
- **Example 1:** $3 \times (5 \times 10^{-4}) = 1.5 \times 10^{-3}$ — 3 × 5 EXP (−) 9 =
- **Example 2:** $5 \times (9+7) = 80$ — 5 × ( 9 + 7 ) =
- You can skip all ) operations before =

### ■ Fraction Calculations

- Values are displayed in decimal format automatically whenever the total number of digits of a fractional value (integer + numerator + denominator + separator marks) exceeds 10.
- **Example 1:** $\frac{2}{3} + \frac{1}{5} = \frac{13}{15}$ — 2 a b/c 3 + 1 a b/c 5 = → 13⌟15.
- **Example 2:** $3\frac{1}{4} + 1\frac{2}{3} = 4\frac{11}{12}$ — 3 a b/c 1 a b/c 4 + 1 a b/c 2 a b/c 3 = → 4⌟11⌟12.
- **Example 3:** $\frac{2}{4} = \frac{1}{2}$ — 2 a b/c 4 = → 1⌟2
- **Example 4:** $\frac{1}{2} + 1.6 = 2.1$ — 1 a b/c 2 + 1.6 = → 2.1
- Results of calculations that mix fraction and decimal values are always decimal.

### • Decimal ↔ Fraction Conversion

- **Example 1:** $2.75 = 2\frac{3}{4}$ (Decimal → Fraction) — 2.75 = → 2.75; a b/c → 2⌟3⌟4.; = $\frac{11}{4}$ SHIFT d/c → 11⌟4.
- **Example 2:** $\frac{1}{2} \leftrightarrow 0.5$ (Fraction ↔ Decimal) — 1 a b/c 2 = → 1⌟2.; a b/c → 0.5; a b/c → 1⌟2.

### • Mixed Fraction ↔ Improper Fraction Conversion

- **Example:** $1\frac{2}{3} \leftrightarrow \frac{5}{3}$ — 1 a b/c 2 a b/c 3 = → 1⌟2⌟3.; SHIFT d/c → 5⌟3.; SHIFT d/c → 1⌟2⌟3.

### ■ Degrees, Minutes, Seconds Calculations

- You can perform sexagesimal calculations using degrees (hours), minutes, and seconds, and convert between sexagesimal and decimal values.
- **Example 1:** To convert the decimal value 2.258 to a sexagesimal value and then back to a decimal value

  2.258 = → 2.258
  SHIFT (−) → 2°15°28.8
  ... → 2.258
- **Example 2:** To perform the following calculation:

  12°34'56" × 3.45 — 12 ... 34 ... 56 ... × 3.45 = → 43°24°31.2

### ■ FIX, SCI, RND

- To change the settings for the number of decimal places, the number of significant digits, or the exponential display format, press the MODE key a number of times until you reach the setup screen shown below.
- Press the number key (1, 2, or 3) that corresponds to the setup item you want to change.
  1 ( Fix ) Number of decimal places
  2 ( Sci ) Number of significant digits
  3 (Norm) Exponential display format

  Fix Sci Norm
  1 2 3
- **Example 1:** 200 ÷ 7 × 14 = — 200 ÷ 7 × 14 = → 400.
  (Specifies three decimal places.) MODE ..... 1 (Fix) 3 → 400.000
  (Internal calculation continues using 12 digits.) 200 ÷ 7 = → 28.571
  × 14 = → 400.000

  The following performs the same calculation using the specified number of decimal places.

  200 ÷ 7 = → 28.571
  (Internal rounding) SHIFT Rnd → 28.571
  × 14 = → 399.994
- Press MODE ..... 3 (Norm) 1 to clear the Fix specification.
- **Example 2:** 1 ÷ 3, displaying result with two significant digits (Sci 2)

  MODE ..... 2 (Sci) 2 1 ÷ 3 = → $3.3^{-01}$
- Press MODE ..... 3 (Norm) 1 to clear the Sci specification.

## Memory Calculations COMP

Use the MODE key to enter the COMP Mode when you want to perform a calculation using memory.
COMP ..... MODE 1

### ■ Independent Memory

- To clear independent memory (M), input 0 SHIFT STO M (M+).
- **Example:**

| | |
|---|---|
| 23 + 9 = **32** | 23 + 9 SHIFT STO M (M+) |
| 53 − 6 = **47** | 53 − 6 M+ |
| −) 45 × 2 = **90** | 45 × 2 SHIFT M− |
| (Total) **−11** | RCL M (M+) |

### ■ Variables

- There are nine variables (A through F, M, X and Y), which can be used to store data, constants, results, and other values.
- Use the following operation to delete deat assigned to a particular variable: 0 SHIFT STO A. This operation de letes the data assigned to variable A.
- Perform the following key operation when you want to clear the values assigned to all of the variables. SHIFT CLR 1 (Mcl) =
- **Example:** 193.2 ÷ 23 = **8.4** — 193.2 SHIFT STO A ÷ 23 =
  193.2 ÷ 28 = **6.9** — ALPHA A ÷ 28 =

## Scientific Function Calculations COMP

Use the MODE key to enter the COMP Mode when you want to perform scientific function calculations.
COMP ..... MODE 1

### ■ Trigonometric/Inverse Trigonometric Functions

- To change the default angle unit (degrees, radians, grads), press the MODE key a number of times until you reach the angle unit setup screen shown below.
- Press the number key (1, 2, or 3) that corresponds to the angle unit you want to use.
  (90° = $\frac{\pi}{2}$ radians = 100 grads)

  Deg Rad Gra
  1 2 3
- **Example 1:** sin 63°52'41" = **0.897859012**
  MODE ..... 1 (Deg) sin 63 ... 52 ... 41 ... =
- **Example 2:** $\cos\left(\frac{\pi}{3}\text{ rad}\right) = 0.5$ MODE ..... 2 (Rad) cos ( SHIFT π ÷ 3 ) =
- **Example 3:** $\cos^{-1}\frac{\sqrt{2}}{2} = 0.25\,\pi\,(\text{rad})\left(= \frac{\pi}{4}\text{ (rad)}\right)$ MODE ..... 2 (Rad)
  SHIFT cos ( √ 2 ÷ 2 ) = Ans ÷ SHIFT π =
- **Example 4:** $\tan^{-1} 0.741 = 36.53844577°$ MODE ..... 1 (Deg) SHIFT $\tan^{-1}$ 0.741 =

### ■ Hyperbolic/Inverse Hyperbolic Functions

- **Example 1:** sinh 3.6 = **18.28545536** — hyp sin 3.6 =
- **Example 2:** $\sinh^{-1} 30 = 4.094622224$ — hyp SHIFT $\sinh^{-1}$ 30 =

### ■ Common and Natural Logarithms/Antilogarithms

- **Example 1:** log 1.23 = **0.089905111** — log 1.23 =
- **Example 2:** ln 90 (= $\log_e 90$) = **4.49980967** — ln 90 =
  ln $e$ = **1** — ln ALPHA e =
- **Example 3:** $e^{10} = 22026.46579$ — SHIFT $e^x$ 10 =
- **Example 4:** $10^{1.5} = 31.6227766$ — SHIFT $10^x$ 1.5 =
- **Example 5:** $2^{-3} = 0.125$ — 2 ^ (−) 3 =

### ■ Square Roots, Cube Roots, Roots, Squares, Cubes, Reciprocals, Factorials, Random Numbers, π, and Permutation/Combination

- **Example 1:** $\sqrt{2} + \sqrt{3} \times \sqrt{5} = 5.287196909$ — √ 2 + √ 3 × √ 5 =
- **Example 2:** $\sqrt[3]{5} + \sqrt[3]{-27} = -1.290024053$ — SHIFT $\sqrt[3]{}$ 5 + SHIFT $\sqrt[3]{}$ ( (−) 27 ) =
- **Example 3:** $\sqrt[7]{123}$ ( = $123^{\frac{1}{7}}$ ) = **1.988647795** — 7 SHIFT $\sqrt[3]{}$ 123 =
- **Example 4:** $123 + 30^2 = 1023$ — 123 + 30 $x^2$ =

- **Example 5:** $12^3 = 1728$ — 12 $x^3$ =
- **Example 6:** $\frac{1}{\frac{1}{3}-\frac{1}{4}} = 12$ — ( 3 $x^{-1}$ − 4 $x^{-1}$ ) $x^{-1}$ =
- **Example 7:** $8! = 40320$ — 8 SHIFT $x!$ =
- **Example 8:** To generate a random number between 0.000 and 0.999 — SHIFT Ran# = → 0.664 (The above value is a sample only. Results differ each time.)
- **Example 9:** $3\pi = 9.424777961$ — 3 SHIFT $\pi$ =
- **Example 10:** To determine how many different 4-digit values can be produced using the numbers 1 through 7
- Numbers cannot be duplicated within the same 4-digit value (1234 is allowed, but 1123 is not). **(840)** 7 SHIFT $nP_r$ 4 =
- **Example 11:** To determine how many different 4-member groups can be organized in a group of 10 individuals **(210)** 10 $nC_r$ 4 =

## ■ Angle Unit Conversion

- Press SHIFT MODE to display the following menu.
- Pressing 1, 2, or 3 converts the displayed value to the corresponding angle unit.

D R G
1 2 3

- **Example:** To convert 4.25 radians to degrees

MODE ····· 1(Deg) 4.25 SHIFT DRG▶ 2(R) = → 4.25 / 243.5070629

## ■ Coordinate Conversion (Pol ($x$, $y$), Rec ($r$, $\theta$)

- Calculation results are automatically assigned to variables E and F.
- **Example 1:** To convert polar coordinates ( $r$=2, $\theta$=60°) to rectangular coordinates ($x$, $y$) (Deg) $x = 1$ SHIFT Rec( 2 , 60 ) = $y = 1.732050808$ RCL F
- Press RCL E to display the value of $x$ or RCL F to display the value of $y$.
- **Example 2:** To convert rectangular coordinates (1, $\sqrt{3}$) to polar coordinates ($r$, $\theta$) (Rad) $r = 2$ Pol( 1 , $\sqrt{}$ 3 ) = $\theta = 1.047197551$ RCL F
- Press RCL E to display the value of $r$, or RCL F to display the value of $\theta$.

## ■ Engineering Notation Calculations

- **Example 1:** To convert 56,088 meters to kilometers
  → $56.088 \times 10^3$ (km) — 56088 = ENG
- **Example 2:** To convert 0.08125 grams to milligrams
  → $81.25 \times 10^{-3}$ (mg) — 0.08125 = ENG

# Statistical Calculations — SD / REG

## Standard Deviation — SD

Use the MODE key to enter the SD Mode when you want to perform statistical calculations using standard deviation.
SD ····· MODE 2

- In the SD Mode and REG Mode, the M+ key operates as the DT key.
- Always start data input with SHIFT CLR 1(Scl) = to clear statistical memory.
- Input data using the key sequence shown below. <$x$-data> DT
- Input data is used to calculate values for $n$, $\Sigma x$, $\Sigma x^2$, $\bar{x}$, $\sigma_n$ and $\sigma_{n-1}$, which you can recall using the key operations noted nearby.

| To recall this type of value: | Perform this key operation: |
|---|---|
| $\Sigma x^2$ | SHIFT S-SUM 1 |
| $\Sigma x$ | SHIFT S-SUM 2 |
| $n$ | SHIFT S-SUM 3 |
| $\bar{x}$ | SHIFT S-VAR 1 |
| $\sigma_n$ | SHIFT S-VAR 2 |
| $\sigma_{n-1}$ | SHIFT S-VAR 3 |

- **Example:** To calculate $\sigma_{n-1}$, $\sigma_n$, $\bar{x}$, $n$, $\Sigma x$, and $\Sigma x^2$ for the following data : 55, 54, 51, 55, 53, 53, 54, 52

In the SD Mode: SHIFT CLR 1(Scl) = (Stat clear) 55 DT → n= SD 1.

Each time you press DT to register your input, the number of data input up to that point is indicated on the display ($n$ value).

54 DT 51 DT 55 DT 53 DT DT 54 DT 52 DT

Sample Standard Deviation ($\sigma_{n-1}$) = **1.407885953** — SHIFT S-VAR 3 =
Population Standard Deviation ($\sigma_n$) = **1.316956719** — SHIFT S-VAR 2 =
Arithmetic Mean ($\bar{x}$) = **53.375** — SHIFT S-VAR 1 =
Number of Data ($n$) = **8** — SHIFT S-SUM 3 =
Sum of Values ($\Sigma x$) = **427** — SHIFT S-SUM 2 =
Sum of Squares of Values ($\Sigma x^2$) = **22805** — SHIFT S-SUM 1 =

## Regression Calculations — REG

Use the MODE key to enter the REG Mode when you want to perform statistical calculations using regression.
REG ····· MODE 3

In the SD Mode and REG Mode, the M+ key operates as the DT key.
Entering the REG Mode displays screens like the onesshown below.

Lin Log Exp →
1 2 3

▶ ⬇ ↑ ◀

←Pwr Inv Quad
1 2 3

- Press the number key (1, 2, or 3) that corresponds to the type of regression you want to use.

1 ( Lin ): Linear regression
2 ( Log ): Logarithmic regression
3 ( Exp ): Exponential regression
▶ 1 ( Pwr ): Power regression
▶ 2 ( Inv ): Inverse regression
▶ 3 (Quad): Quadratic regression

- Input data using the key sequence shown below. <$x$-data> , <$y$-data> DT
- The values produced by a regression calculation depend on the values input, and results can be recalled using the key operations shown in the table below.

| To recall this type of value: | Perform this key operation: |
|---|---|
| $\Sigma x^2$ | SHIFT S-SUM 1 |
| $\Sigma x$ | SHIFT S-SUM 2 |
| $n$ | SHIFT S-SUM 3 |
| $\Sigma y^2$ | SHIFT S-SUM ▶ 1 |
| $\Sigma y$ | SHIFT S-SUM ▶ 2 |
| $\Sigma xy$ | SHIFT S-SUM ▶ 3 |
| $\bar{x}$ | SHIFT S-VAR 1 |
| $x\sigma_n$ | SHIFT S-VAR 2 |
| $x\sigma_{n-1}$ | SHIFT S-VAR 3 |
| $\bar{y}$ | SHIFT S-VAR ▶ 1 |
| $y\sigma_n$ | SHIFT S-VAR ▶ 2 |
| $y\sigma_{n-1}$ | SHIFT S-VAR ▶ 3 |
| Regression coefficient A | SHIFT S-VAR ▶ ▶ 1 |
| Regression coefficient B | SHIFT S-VAR ▶ ▶ 2 |
| Regression calculation other than quadratic regression | |
| Correlation coefficient $r$ | SHIFT S-VAR ▶ ▶ 3 |
| $\hat{x}$ | SHIFT S-VAR ▶ ▶ ▶ 1 |
| $\hat{y}$ | SHIFT S-VAR ▶ ▶ ▶ 2 |

- The following table shows the key operations you should use to recall results in the case of quadratic regression.

| To recall this type of value: | Perform this key operation: |
|---|---|
| $\Sigma x^3$ | SHIFT S-SUM ▶ ▶ 1 |
| $\Sigma x^2 y$ | SHIFT S-SUM ▶ ▶ 2 |
| $\Sigma x^4$ | SHIFT S-SUM ▶ ▶ 3 |
| Regression coefficient C | SHIFT S-VAR ▶ ▶ 3 |
| $\hat{x}_1$ | SHIFT S-VAR ▶ ▶ ▶ 1 |
| $\hat{x}_2$ | SHIFT S-VAR ▶ ▶ ▶ 2 |
| $\hat{y}$ | SHIFT S-VAR ▶ ▶ ▶ 3 |

- The values in the above tables can be used inside of expressions the same way you use variables.

### • Linear Regression

- The regression formula for linear regression is: $y = A + Bx$.
- **Example:**

| Temperature | Atmospheric Pressure |
|---|---|
| 10°C | 1003 hPa |
| 15°C | 1005 hPa |
| 20°C | 1010 hPa |
| 25°C | 1011 hPa |
| 30°C | 1014 hPa |

Atmospheric Pressure vs. Temperatu Perform linear regression to determine the regression formula terms and correlation coefficient for the data nearby. Next, use the regression formula to estimate atmospheric pressure at −5°C and temperature at 1000 hPa. Finally, calculate the coefficient of determination ($r^2$) and sample covariance $\left(\frac{\Sigma xy - n \cdot \bar{x} \cdot \bar{y}}{n-1}\right)$

In the REG Mode: 1(Lin)

SHIFT CLR 1(Scl) = (Stat clear) 10 , 1003 DT → n= REG 1.

Each time you press DT to register your input, the number of data input up to that point is indicated on the display ($n$ value).

15 , 1005 DT  20 , 1010 DT  25 , 1011 DT  30 , 1014 DT

Regression Coefficient A = **997.4** — SHIFT S-VAR ▶ ▶ 1 =
Regression Coefficient B = **0.56** — SHIFT S-VAR ▶ ▶ 2 =
Correlation Coefficient $r$ = **0.982607368** — SHIFT S-VAR ▶ ▶ 3 =
Atmospheric Pressure at −5°C = **994.6** — ( (−) 5 ) SHIFT S-VAR ▶ ▶ ▶ 2 =
Temperature at 1000 hPa = **4.642857143** — 1000 SHIFT S-VAR ▶ ▶ ▶ 1 =
Coefficient of Determination = **0.965517241** — SHIFT S-VAR ▶ ▶ 3 $x^2$ =
Sample Covariance = **35** — ( SHIFT S-VAR ▶ 3 =

SHIFT S-VAR 3 × SHIFT S-VAR 1 × SHIFT S-VAR ▶ 1 ) ÷ ( SHIFT S-VAR 3 − 1 ) =

### • Logarithmic, Exponential, Power, and Inverse Regression

- Use the same key operations as linear regression to recall results for these types of regression.
- The following shows the regression formulas for each type of regression.

| | |
|---|---|
| Logarithmic Regression | $y = A + B \cdot \ln x$ |
| Exponential Regression | $y = A \cdot e^{B \cdot x}$ ($\ln y = \ln A + B$) |
| Power Regression | $y = A \cdot x^B$ ($\ln y = \ln A + B \ln$) |
| Inverse Regression | $y = A + B \cdot {}^1/_x$ |

### • Quadratic Regression

- The regression formula for quadratic regression is: $y = A + Bx + Cx^2$.
- **Example:**

| $x_i$ | $y_i$ |
|---|---|
| 29 | 1.6 |
| 50 | 23.5 |
| 74 | 38.0 |
| 103 | 46.4 |
| 118 | 48.0 |

Perform quadratic regression to determine the regression formula terms for the data nearby. Next, use the regression formula to estimate the values for $\hat{y}$ (estimated value of $y$) for $x_i = 16$ and $\hat{x}$ (estimated value of $x$) for $y_i = 20$.

In the REG Mode: ▶ 3(Quad) SHIFT CLR 1(Scl) = (Stat clear)

29 , 1.6 DT 50 , 23. 5 DT  74 , 38.0 DT 103 , 46. 4 DT  118 , 48. 0 DT

Regression Coefficient A = **−35.59856934** — SHIFT S-VAR ▶ ▶ 1 =
Regression Coefficient B = **1.495839413** — SHIFT S-VAR ▶ ▶ 2 =
Regression Coefficient C = **−6.71629667 × 10⁻³** — SHIFT S-VAR ▶ ▶ 3 =
$\hat{y}$ when $x_i$ is 16 = **−13.38291067** — 16 SHIFT S-VAR ▶ ▶ ▶ 3 =
$\hat{x}_1$ when $y_i$ is 20 = **47.14556728** — 20 SHIFT S-VAR ▶ ▶ ▶ 1 =
$\hat{x}_2$ when $y_i$ is 20 = **175.5872105** — 20 SHIFT S-VAR ▶ ▶ ▶ 2 =

# 350MS/82MS 说明书

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※本产品保修期限：购买三个月内，出厂日起六个月内。
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## 使用前的准备

### ■模式

在开始计算之前，您必须先进入右表所列的适当模式。

| 要执行的计算类型 | 需执行的键操作 | 需进入的模式 |
|---|---|---|
| 基本算述运算 | MODE 1 | COMP |
| 标准差 | MODE 2 | SD |
| 回归计算 | MODE 3 | REG |

## 基本计算 COMP

当您要进行基本计算时，请使用 MODE 键进入COMP模式。
COMP ..... MODE 1

- 计算式中的负数值必须用括号括起来。
  sin −1.23 → sin (−) 1.23 )
- 负的指数不需要括号括起来。
  sin 2.34 × $10^{-5}$ → sin 2.34 EXP (−) 5
- 范例1： 3x(5 × $10^{-4}$) = **1.5x $10^{-3}$**　3 × 5 EXP (−) 9 =
- 范例2： 5x(9 + 7)= **80**　5 × ( 9 + 7 ) =
- 等号 = 键前的所有 ) 键操作均可省略。

### ■分数计算

- 当分数值的位数总和（整数+分子+分母+分号）超过10位时，本计算器即会自动以小数的格式显示数值。
- 范例1： $\frac{2}{3}+\frac{1}{5}=\frac{13}{15}$　2 a b/c 3 + 1 a b/c 5 =　13⌟15.
- 范例2： $3\frac{1}{4}+1\frac{2}{3}=4\frac{11}{12}$　3 a b/c 1 a b/c 4 + 1 a b/c 2 a b/c 3 =　4⌟11⌟12.
- 范例3： $\frac{2}{4}=\frac{1}{2}$　2 a b/c 4 =
- 范例4： $\frac{1}{2}+1.6=2.1$　1 a b/c 2 + 1.6 =
- 含分数及小数值的计算结果总是为小数

**• 小数 ↔ 分数格式变换**

- 范例1： $2.75=2\frac{3}{4}$（小数 → 分数）　2.75 =　2.75
  a b/c　2⌟3⌟4.　= $\frac{11}{4}$ SHIFT d/c　11⌟4.
- 范例2： $\frac{1}{2}\leftrightarrow 0.5$（分数 ↔ 小数）　1 a b/c 2 =　1⌟2.
  a b/c　0.5　a b/c　1⌟2.

**• 带分数 ↔ 假分数格式变换**

- 范例： $1\frac{2}{3}\leftrightarrow\frac{5}{3}$　1 a b/c 2 a b/c 3 =　1⌟2⌟3.
  SHIFT d/c　5⌟3.　SHIFT d/c　1⌟2⌟3.

### ■度分秒计算

- 您可以使用度（小时），分和秒来进行60进制计算，也可以在60进制和10进制之间进行转换。
- 范例1： 将10 进制数2.258 转换为 60 进制数，然后再转换回 10 进制数。

2.258 =　2.258　SHIFT °''' 　2°15°28.8
°'''　2.258

- 范例2： 执行下列计算：12°34'56" × 3.45
  12 °''' 34 °''' 56 °''' × 3.45 =　43°24°31.2

### ■FIX, SCI, RND

- 要改变小数位数、有效位数或指数显示格式的设定时，请按 MODE 键数次直到右示设置画面出现为止。

Fix Sci Norm
1 2 3

- 按与需要改变的设置项目相对应的数字键（ 1 、2 或 3 ）
1 (Fix):小数位数　2 (Sci):有效位数　3 (Norm):指数显示格式

- 范例1： 200 ÷ 7 × 14=　200 ÷ 7 × 14 =　400.
(指定3位小数)　MODE ..... 1 (Fix) 3　FIX 400.000
(内部计算继续使用12位数进行)　200 ÷ 7 =　28.571
× 14 =　400.000

使用指定的小数位数进行相同的计算。

200 ÷ 7 =　28.571
(内部舍入)　SHIFT Rnd　28.571
× 14 =　399.994

- 按 MODE ..... 3 (Norm) 1 键可清除小数位数（Fix）的设定。
- 范例2： 1÷3，以两位有效位数（Sci2）显示计算结果。

MODE ..... 2 (Sci) 2 1 ÷ 3 =　SCI 3.3$^{-01}$

- 按 MODE ..... 3 (Norm) 1 键可清除小数位数（Sci）的设定。

## 存储器计算 COMP

当您要使用存储器进行计算时，请使用 MODE 键进入COMP模式。
COMP ..... MODE 1

### ■独立存储器

- 若要清除独立存储器(M)中的数值。键入 0 SHIFT STO M (M+) 即可
- 范例： 23 + 9 = **32**　23 + 9 SHIFT STO M (M+)
  53 − 6 = **47**　53 − 6 M+
  45 × 2 = **90**　45 × 2 SHIFT M−
  (总和) **−11**　RCL M (M+)

### ■变量

- 本机备有9个变量（A至F、M、X及Y）可用以储存数据、常数、计算结果及其他数值。
- 使用下述操作可删除赋予指定变量的数据：0 SHIFT STO A 此操作将删除赋予变量A的数据。
- 当您要清除所有变量的数值时，请执行下述键操作。
  SHIFT CLR 1 (Mcl) =
- 范例： 193.2 ÷ 23 = **8.4**　193.2 SHIFT STO A = 23 =
  193.2 ÷ 28 = **6.9**　ALPHA A = 28 =

## 科学函数计算 COMP

当您要进行科学函数运算时，请使用 MODE 键进入COMP模式。
COMP ..... MODE 1

### ■三角函数/反三角函数

- 要改变缺省角度单位（度、弧度、百分度）时，请按 MODE 键数次直到右示角度单位设置画面出现为止。

Deg Rad Gra
1 2 3

- 按与需要使用的角度单位相对应的数字键（1、2 或 3）
（90° = $\frac{\pi}{2}$ 弧度 = 100百分度）
- 范例1： sin 63°52'41" = **0.897859012**　MODE ..... 1 (Deg)
  sin 63 °''' 52 °''' 41 °''' =
- 范例2： $\cos\left(\frac{\pi}{3}\text{rad}\right)=0.5$　MODE ..... 2 (Rad)
  cos ( SHIFT π ÷ 3 ) =
- 范例3： $\cos^{-1}\frac{\sqrt{2}}{2}=0.25\pi\text{ (rad)}\left(=\frac{\pi}{4}\text{(rad)}\right)$　MODE ..... 2 (Rad)
  SHIFT cos ( √ 2 ÷ 2 ) × Ans = SHIFT π =
- 范例4： $\tan^{-1}0.741=36.53844577°$　MODE ..... 1 (Deg)
  SHIFT tan 0.741 =

### ■双曲函数/反双曲函数

- 范例1： sinh 3.6 = **18.28545536**　hyp sin 3.6 =
- 范例2： $\sinh^{-1}130=4.094622224$　hyp SHIFT sin 130 =

### ■常用及自然对数/反对数

- 范例1： log 1.23 = **0.089905111**　log 1.23 =
- 范例2： ln 90 (= $\log_e 90$) = **4.49980967**　ln 90 =
  ln $e$ = **1**　ln ALPHA e =
- 范例3： $e^{10}$ = **22026.46579**　SHIFT e$^x$ 10 =
- 范例4： $10^{1.5}$ = **31.6227766**　SHIFT 10$^x$ 1.5 =
- 范例5： $2^{-3}$ = **0.125**　2 x$^y$ (−) 3 =

### ■平方根、立方根、方根、平方、立方、倒数、阶乘、随机数、圆周率（π）及排列/组合

- 范例1： $\sqrt{2}+\sqrt{3}\times\sqrt{5}=5.287196909$　√ 2 + √ 3 × √ 5 =
- 范例2： $\sqrt[3]{5}+\sqrt[3]{-27}=-1.290024053$
  SHIFT ∛ 5 + SHIFT ∛ ( (−) 27 ) =
- 范例3： $\sqrt[7]{123}$ (= $123^{\frac{1}{7}}$) = **1.988647795**　7 SHIFT √ 123 =
- 范例4： $123+30^2=1023.$　123 + 30 x$^2$ =
- 范例5： $12^3=1728.$　12 x$^3$ =
- 范例6： $\frac{1}{\frac{1}{3}-\frac{1}{4}}=12$　( 3 x$^{-1}$ − 4 x$^{-1}$ ) x$^{-1}$ =
- 范例7： 8! = **40320**　8 SHIFT x!

• 范例8：生成一个0.000与0.999之间的随机数。

[SHIFT] [Ran#] ■ → 0.664

（上值仅为一个范例，每次生成的结果都会不同）

• 范例9：3π　*9.424777961*

3 [SHIFT] [π] ■

• 范例10：试求使用数字1至7能产生多少个不同的4位数

*(840)* 7 [SHIFT] [nPr] 4 ■

• 范例11：试求10个人能组织出多少个不同的4人组。

*(210)* 10 [nCr] 4 ■

## ■ 角度单位转换

请按 [SHIFT] [DRG▶] 键在显示屏上调出右选单

| D | R | G |
|---|---|---|
| 1 | 2 | 3 |

• 范例：将4.25弧度转换为度 [MODE]……[1](Deg)

**角度单位转换**　4.25 [SHIFT] [DRG▶] [2](R) ■ → 4.25 / 243.5070629

## ■ 坐标变换（Pol（x,y），Rec（r, θ））

• 计算结果会自动赋予变量E及F

• 范例1：将极坐标（r=2, θ=60°）变换为直角坐标(x, y)(Deg)

$x$ = *1*　[SHIFT] [Rec] 2 [,] 60 [)] ■　　$y$ = *1.7320508080*　[RCL] [F]

• 按 [RCL] [E] 键显示$x$的值或按 [RCL] [F] 键显示y的值。

• 范例2：　将直角坐标（1, $\sqrt{3}$）变换为极坐标（r, θ）(Rad)

$r$ = *2*　[Rec] 1 [,] [√] 3 [)] ■　　θ = *1.047197551*　[RCL] [F]

• 按 [RCL] [E] 键显示$r$的值或按 [RCL] [F] 键显示 θ 的值

## ■ 工学符号计算

• 范例1：将56,088米变换为公里 → *56.088* ×10³ (km)　56.088 [=] [ENG]

• 范例2：将0.08125克变换为毫克→ *81.25* ×10⁻³ (mg)　0.08125 ■ [ENG]

# 统计计算　SD　REG

## 标准差　SD

当您要使用标准差进行统计计算时，请使用 [MODE] 键进入SD模式。

SD ····· [MODE] [2]

• 在SD模式和REG模式中，[M+]键起[DT]键的作用。

• 在开始数据输入之前，请务必按 [SHIFT] [CLR] [1](Scl) [=] 键清除统计存储器。

• 请使用下述键操作输入数据。< $x$ 数据>[DT]

• 输入的数据是用以计算 $n$，$\Sigma x$，$\Sigma x^2$，$\bar{x}$，$\sigma n$及$\sigma n-1$ 等各清除统计数值，您可使用下述键操作调出这些数值。

| 要调出的数值类型： | 执行的键操作： |
|---|---|
| $\Sigma x^2$ | [SHIFT] [S-SUM] [1] |
| $\Sigma x$ | [SHIFT] [S-SUM] [2] |
| $n$ | [SHIFT] [S-SUM] [3] |
| $\bar{x}$ | [SHIFT] [S-VAR] [1] |
| $\sigma n$ | [SHIFT] [S-VAR] [2] |
| $\sigma n-1$ | [SHIFT] [S-VAR] [3] |

• 范例：试计算下列数据的$\sigma n-1$，$\sigma n$，$\bar{x}$，$n$，$\Sigma x$及$\Sigma x^2$：

55，54，51，55，53，53，54，52.

在SD模式中：[SHIFT] [CLR] [1](Scl) [=](Stat clear)

55 [DT] → n= SD 1.

您每次按[DT]键均会登录一个输入数据，已输入的数据个数会在画面上表示出来（$n$值）

54 [DT] 51 [DT] 55 [DT]

53 [DT] [DT] 54 [DT] 52 [DT]

样本标准差($\sigma n-1$) =1.407885953　[SHIFT] [S-VAR] [3] [=]

总体标准差($\sigma n$) =1.316956719　[SHIFT] [S-VAR] [2] [=]

算术平均值($\bar{x}$) =53.375　[SHIFT] [S-VAR] [1] [=]

数据的个数($n$) =8　[SHIFT] [S-SUM] [3] [=]

数据的和($\Sigma x$) =427　[SHIFT] [S-SUM] [2] [=]

数据的平方和($\Sigma x^2$) =22805　[SHIFT] [S-SUM] [1] [=]

## 回归计算　REG

当您要使用回归进行统计计算时，请使用[MODE]键进入REG模式。

REG ····· [MODE] [3]

• 进入REG模式时与右示画面相似的画面会出现

Lin Log Exp →
1 2 3

[▶] [↓] [↑] [◀]

←Pwr Lnv Quad
1 2 3

• 按与需要使用的回归种类相对应的数字键（[1] [2] 或 [3]）

[1](Lin)：线性回归　　[▶] [1](Pwr)：乘方回归

[2](Log)：对数回归　　[▶] [2](Inv)：逆回归

[3](Exp)：指数回归　　[▶] [3](Quad)：二次回归

• 请使用下述键操作输入数据< $x$数据> [,] <$y$数据> [DT]

• 回归计算的结果是由输入的数值决定的，计算结果可以按照下表所示的键操作调出

| 要调出的数值类型： | 执行的键操作： |
|---|---|
| $\Sigma x^2$ | [SHIFT] [S-SUM] [1] |
| $\Sigma x$ | [SHIFT] [S-SUM] [2] |
| $n$ | [SHIFT] [S-SUM] [3] |
| $\Sigma x^2$ | [SHIFT] [S-SUM] [▶] [1] |
| $\Sigma y$ | [SHIFT] [S-SUM] [▶] [2] |
| $\Sigma xy$ | [SHIFT] [S-SUM] [▶] [3] |
| $\bar{x}$ | [SHIFT] [S-VAR] [1] |
| $x\sigma n$ | [SHIFT] [S-VAR] [2] |
| $x\sigma n-1$ | [SHIFT] [S-VAR] [3] |
| $\bar{y}$ | [SHIFT] [S-VAR] [▶] [1] |
| $y\sigma n$ | [SHIFT] [S-VAR] [▶] [2] |
| $y\sigma n-1$ | [SHIFT] [S-VAR] [▶] [3] |
| 回归系数A | [SHIFT] [S-VAR] [▶] [▶] [1] |
| 回归系数B | [SHIFT] [S-VAR] [▶] [▶] [2] |
| 仅非二次回归 | |
| 相关系数$r$ | [SHIFT] [S-VAR] [▶] [▶] [3] |
| $\hat{x}$ | [SHIFT] [S-VAR] [▶] [▶] [▶] [1] |
| $\hat{y}$ | [SHIFT] [S-VAR] [▶] [▶] [▶] [2] |

• 右表列出了要调出二次回归的计算结果时应使用的键操作

• 右表中的数值可以与使用变量相同的方法在表达式中使用

| 要调出的数值类型： | 执行的键操作： |
|---|---|
| $\Sigma x^3$ | [SHIFT] [S-SUM] [▶] [▶] [1] |
| $\Sigma x^2y$ | [SHIFT] [S-SUM] [▶] [▶] [2] |
| $\Sigma x^4$ | [SHIFT] [S-SUM] [▶] [▶] [3] |
| 回归系数C | [SHIFT] [S-VAR] [▶] [▶] [3] |
| $\hat{x}$ | [SHIFT] [S-VAR] [▶] [▶] [▶] [1] |
| $\hat{x}$ | [SHIFT] [S-VAR] [▶] [▶] [▶] [2] |
| $\hat{y}$ | [SHIFT] [S-VAR] [▶] [▶] [▶] [3] |

## ●线性回归　线性回归的回归公式为：$y=A+Bx$。

• 范例：大气压与气温的关系

| 气温 | 大气压 |
|---|---|
| 10℃ | 1003hPa |
| 15℃ | 1005hPa |
| 20℃ | 1010hPa |
| 25℃ | 1011hPa |
| 30℃ | 1014hPa |

进行左表所示数据的线性回归，求出回归公式的常数及相关系数。然后，再使用回归公式估计气温为-5℃时的大气压及大气压为1000hPa时的气温。最后计算决定系数（$r^2$）及样本协方差

$\left(\frac{\Sigma xy - n \cdot \bar{x} \cdot \bar{y}}{n-1}\right)$

在回归（REG）模式中：[1](Lin)　[SHIFT] [CLR] [1](Scl) [=](Stat clear)

10 [,] 1003 [DT] → n= REG 1.

您每次按[DT]键均会登录一个输入数据，已输入的数据个数会在画面上表示出来（$n$值）

15 [,] 1005 [DT]

20 [,] 1010 [DT] 25 [,] 1011 [DT]

30 [,] 1014 [DT]

回归系数A= *997.4*　[SHIFT] [S-VAR] [▶] [▶] [1] [=]

回归系数B= *0.56*　[SHIFT] [S-VAR] [▶] [▶] [2] [=]

相关系数r= *0.982607368*　[SHIFT] [S-VAR] [▶] [▶] [3] [=]

气温为-5 ℃时的大气压= *99.46*　[(] [(-)] 5 [)] [SHIFT] [S-VAR] [▶] [▶] [2] [=]

大气压为1000hPa时的气温= *4.642857143*　1000 [SHIFT] [S-VAR] [▶] [▶] [1] [=]

决定系数= *0.965517241*　[SHIFT] [S-VAR] [▶] [▶] [3] [$x^2$] [=]

样本协方差= *35*　[(] [SHIFT] [S-VAR] [▶] [3] ■

[SHIFT] [S-VAR] [3] [×] [SHIFT] [S-VAR] [1] [×]

[SHIFT] [S-VAR] [▶] [1] [)] ■

[(] [SHIFT] [S-VAR] [3] ■ 1 [)] [=]

## ●对数，指数，乘方及逆回归

使用与线性回归相同的键操作能调出这些类型回归的计算结果。

• 右表列出了各种回归的回归公式

| | |
|---|---|
| 对数回归 | $y=A+B\cdot\ln x$ |
| 指数回归 | $y=A\cdot e^{B\cdot x}(\ln y=\ln A+Bx)$ |
| 乘方回归 | $y=A\cdot x^B(\ln y=\ln A+B\ln x)$ |
| 逆回归 | $y=A+B\cdot{}^1/x$ |

## ●二次回归　二次回归的回归公式是：$y=A+Bx+Cx^2$

• 范例：

| $xi$ | $yi$ |
|---|---|
| 29 | 1.6 |
| 50 | 23.5 |
| 74 | 38.0 |
| 103 | 46.4 |
| 118 | 48.0 |

用左表所表示的数据进行二次回归计算，求出回归公式的各项回归系数。然后用此回归公式估计 $xi$=16时的 $\hat{y}$ 值（$y$的估计值）和 $yi$=20时的 $\hat{x}$ 值（$x$的估计值）

在回归（REG）模式中：[▶] [3](Quad)

[SHIFT] [CLR] [1](Scl) [=](Stat clear)

29 [,] 1.6 [DT] 50 [,] 23.5 [DT]

74 [,] 38.0 [DT] 103 [,] 46.4 [DT]

118 [,] 48.0 [DT]

回归系数 A = *-35.59656934*　[SHIFT] [S-VAR] [▶] [▶] [1] [=]

回归系数 B = *1.495939413*　[SHIFT] [S-VAR] [▶] [▶] [2] [=]

回归系数 C = *-6.71629667 x 10⁻³*　[SHIFT] [S-VAR] [▶] [▶] [3] [=]

当$xi$=16时的估计值$\hat{y}$= *-13.38291067*　16 [SHIFT] [S-VAR] [▶] [▶] [▶] [3] [=]

当$yi$=20时的估计值$\hat{x}1$= *47.14556728*　20 [SHIFT] [S-VAR] [▶] [▶] [▶] [1] [=]

当$yi$=20时的估计值$\hat{x}2$=*175.5872105*　20 [SHIFT] [S-VAR] [▶] [▶] [▶] [2] ■